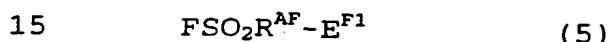
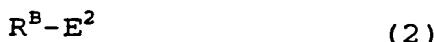


WHAT IS CLAIMED IS:

1. A process for producing a fluorine atom-containing sulfonyl fluoride compound, which comprises reacting a compound of the following formula (1) with a compound of 5 the following formula (2) to form a compound of the formula (3), then, reacting the compound of the formula (3) with fluorine in a liquid phase to form a compound of the following formula (4), and further, decomposing the compound of the formula (4) to obtain a compound of the 10 following formula (5):



wherein  $R^A$  is a bivalent organic group,  $E^1$  is a monovalent reactive group,  $R^B$  is a monovalent organic group,  $E^2$  is a monovalent reactive group which is reactive with  $E^1$ ,  $E$  is a bivalent connecting group formed 20 by the reaction of  $E^1$  with  $E^2$ ,  $R^{AF}$  is the same group as  $R^A$ , or a bivalent organic group formed by the fluorination of  $R^A$ ,  $R^{BF}$  is the same group as  $R^B$ , or a monovalent organic group formed by the fluorination of  $R^B$ ,  $E^F$  is the same group as  $E$ , or a bivalent connecting group formed by the 25 fluorination of  $E$ ,  $E^{F1}$  is a monovalent group formed by the decomposition of  $E^F$ , and  $X$  is a halogen atom, provided that at least one of  $R^A$ ,  $R^B$  and  $E$  is a group

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which can be fluorinated, and at least one of  $R^A$ ,  $R^B$  and  $E^F$  is a group formed by the fluorination of  $R^A$ ,  $R^B$  and  $E$ , respectively.

2. The process for producing a fluorine atom-containing sulfonyl fluoride compound according to Claim 1, wherein X is a fluorine atom.
3. The process for producing a fluorine atom-containing sulfonyl fluoride compound according to Claim 1, wherein the fluorine content in the compound of the formula (3) is at least 30 mass%.
4. The process for producing a fluorine atom-containing sulfonyl fluoride compound according to Claim 1, wherein the molecular weight of the compound of the formula (3) is from 200 to 1,000.
- 15 5. The process for producing a fluorine atom-containing sulfonyl fluoride compound according to Claim 1, wherein  $R^A$  is a bivalent organic group selected from the group consisting of a perfluoro bivalent saturated hydrocarbon group, a perfluoro(partially halogeno bivalent saturated hydrocarbon) group, a perfluoro(hetero atom-containing bivalent saturated hydrocarbon) group, and a perfluoro(partially halogeno(hetero atom-containing bivalent saturated hydrocarbon)) group, and  $R^B$  is a monovalent organic group selected from the group consisting of a perfluoro monovalent saturated hydrocarbon group, a perfluoro(partially halogeno monovalent saturated hydrocarbon) group, a
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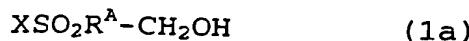
perfluoro(hetero atom-containing monovalent saturated hydrocarbon) group, and a perfluoro(partially halogeno(hetero atom-containing monovalent saturated hydrocarbon)) group.

5 6. The process for producing a fluorine atom-containing sulfonyl fluoride compounds according to Claim 1, wherein the compound of the formula (4) is decomposed to obtain not only the compound of the formula (5), but also a compound of the following formula (6):



wherein  $E^{F2}$  is a monovalent group formed by the decomposition of  $E^F$ , which may be the same as or different from  $E^{F1}$ , and  $R^{BF}$  is as defined above.

7. The process for producing a fluorine atom-containing 15 sulfonyl fluoride compound according to Claim 1, wherein the compound of the formula (1) is a compound of the following formula (1a), the compound of the formula (2) is a compound of the following formula (2a), the compound of the formula (3) is a compound of the following formula 20 (3a), the compound of the formula (4) is a compound of the following formula (4a), and the compound of the formula (5) is a compound of the following formula (5a):



wherein Y is a halogen atom which is the same as or different from X, and R<sup>A</sup>, R<sup>B</sup>, R<sup>AF</sup> and R<sup>BF</sup> are as defined above.

8. The process for producing a fluorine atom-containing 5 sulfonyl fluoride compound according to Claim 7, wherein the compound of the formula (4a) is decomposed to obtain not only the compound of the formula (5a), but also a compound of the following formula (6a):



10 wherein R<sup>BF</sup> is as defined above.

9. The process for producing a fluorine atom-containing sulfonyl fluoride compound according to Claim 8, wherein the compound of the formula (2a) has the same structure as the compound of the formula (6a), and at least a part 15 of the compound of the formula (6a) obtained from the reaction product obtained by the decomposition of the compound of the formula (4a), is used as at least a part of the compound of the formula (2a) to react with the compound of the formula (1a), to continuously obtain the 20 compound of the formula (5a).

10. A compound of the following formula (I) or a compound of the following formula (II):

